

CLAIMS

What is claimed is:

1. A distributed cellular communication system comprising:
 - 5 a network;
 - a public switched telephone network (PSTN) coupled to the network;
 - a plurality of transceiver coupled to the network, the plurality of transceivers geographically separated from one another and each configured to communicate over a wireless medium with mobile stations in an associated cell;
- 10 at least one data processing system coupled to the network, the at least one data processing system configured to execute computer programs including software functional blocks adapted to enable the plurality of transceivers to communicate data between mobile stations and between a mobile station and the PSTN, the software functional blocks including:
 - 15 a mobility management (MM) functional block to implement MM functions;
 - a visitor location registry (VLR) functional block to implement VLR functions;
 - a communication management(CM) functional block to implement CM functions; and
- 20 a plurality of radio resources (RR) functional blocks to implement RR functions including maintaining communication between a mobile station and the network by switching communication among the plurality of transceivers as the mobile station moves from one cell to another cell.
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2. A communication system according to claim 1, wherein communication traffic among the transceivers and the software functional blocks is load-balanced to provide increased efficiency.
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3. A communication system according to claim 1, wherein the network is a network selected from a group comprising:
 - circuit switched networks;
 - internet protocol (IP) networks; and

asynchronous Transfer Mode (ATM) networks.

4. A communication system according to claim 1, wherein the network is an internet protocol (IP) network, and wherein the PSTN is coupled to the IP network via a voice gateway.
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- 10 5. A communication system according to claim 4, wherein the voice gateway comprises a voice gateway functional block including software to implement functions including converting between voice communication transmitted over the PSTN and packets transmitted over the IP network, and routing the packets over the IP network.
- 15 6. A communication system according to claim 5, wherein the voice gateway software functional block, the MM functional block and the VLR functional block are resident on a special purpose data processing system known as a mobile services center (MSC).
- 20 7. A communication system according to claim 6, wherein at least one of the plurality of RR functional blocks is resident on a special purpose data processing system known as a base station controller (BSC).
- 25 8. A communication system according to claim 1, wherein the data communicated between mobile stations and between a mobile station and the PSTN includes voice communication.
9. A communication system according to claim 1, wherein each of the plurality of transceivers includes a transceiver and a base transceiver station (BTS) software functional block resident on a data processing system coupled to the network.
- 30 10. A distributed cellular network for providing wireless communication with a plurality of mobile stations, comprising:
a plurality of base transceiver station network elements configured to communicate with the plurality of mobile stations over a wireless medium, wherein each base transceiver station includes a network interface adapted to couple to a network;

a plurality of base station controller network elements each including a network interface adapted to couple to the network;

at least one mobile station controller network element including a network interface adapted to couple to the network;

5 wherein communication traffic among the base transceiver stations, the base station controllers and the mobile switching center is load-balanced for efficiency.

11. The distributed cellular network of claim 10, wherein:

each of the network elements is given a predetermined network address and
10 communication traffic is routed to each of the network elements based on the predetermined network addresses.

12. The distributed cellular network of claim 11, wherein:

the communication traffic for each of the network elements is routed so as to
15 balance the processing load among the network elements.

13. The distributed cellular network of claim 11, wherein:

if one of the network element fails, communication traffic is routed to another network element capable of performing the required functions.

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14. The distributed cellular network of claim 10, wherein:

one of the network elements is a gatekeeper and is configured to manage voice communications over an Internet protocol.

25 15. The distributed cellular network of claim 14, wherein:

the voice communications are preferably routed by the gatekeeper internal to the network before sending the voice communications to an external network.

30 16. A method of providing wireless communication with a plurality of mobile stations using a cellular network including a plurality of network elements, comprising the steps of:

communicating inbound information with a mobile station over a transceiver network element;

communicating the inbound information with one of at least two base station controller network elements to further process the inbound information;

communicating the inbound information with a mobile station controller network element to further process the inbound information;

5 the communicating steps include communicating network traffic among the network elements is load-balanced for efficiency.

17. The method of claim 16, wherein:

each of the network elements is given a predetermined network address and the
10 step of communicating the network traffic includes routing to each of the network elements based on the predetermined network addresses.

18. The method of claim 17, wherein:

the communicating steps include routing network traffic for each of the network
15 elements so as to balance the processing load among the network elements.

19. The method of claim 17, wherein:

if one of the network element fails, communication traffic is routed to another network element capable of performing the required functions.

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20. The method of claim 16, where one of the network elements is a gatekeeper and wherein:

the communicating steps include managing voice communications using an Internet protocol.

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21. The method of claim 20, wherein:

the voice communications are preferably routed by the gatekeeper internal to the network before sending the voice communications to an external network.